BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
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Technical Requirements for the Mobile Challenge, Verification, and Crowdsource Processes	)	WC Docket No. 19-195
	)	

COMMENTS OF VERIZON

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Verizon supports the Commission's efforts to produce more granular and precise maps to assist federal and state policymakers, as well as consumers, determine where broadband services are available and where they are not. We recognize the importance of a public and consumer-friendly challenge process to ensure the accuracy of providers' maps. But because the mobile challenge, verification, and crowdsourcing procedures discussed in the *Public Notice* raise a broad array of complex issues,[2] Verizon suggests certain modifications to the proposed processes to make them more workable and effective. Chief among them is the recommendation that the Commission implement the new processes in phases, beginning with the stationary 4G LTE maps, giving the Commission, providers, and interested third parties the chance to work through the challenge and verification procedures and adjust them as needed.

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[1] The Verizon companies participating in this filing are the regulated, wholly owned subsidiaries of Verizon Communications Inc.

[2] *Comment Sought on Technical Requirements for the Mobile Challenge, Verification, and Crowdsource Processes Required Under the Broadband DATA Act*, Public Notice, WC Docket No. 19-195, DA 21-853 (July 16, 2021) ("*Public Notice*").

I. Introduction and Summary

Pursuant to the Broadband DATA Act and the *Second Report and Order*, mobile broadband providers must submit 3G, 4G, and 5G coverage maps that reflect specified download and upload speeds, a 90 percent cell edge probability, and a 50 percent cell loading factor.[3] For each mobile broadband technology, providers must submit two coverage maps: a map depicting "pedestrian stationary" usage and a map depicting "in-vehicle mobile" usage.[4]

The Commission adopted the framework for the Broadband DATA Act's challenge, verification, and crowdsourcing processes in the *Second Report and Order* and the *Third Report and Order*,[5] but it delegated the design of those processes to the Wireless Telecommunications Bureau (WTB), the Office of Economics and Analytics (OEA), and the Office of Engineering and Technology (OET) ("the Bureaus"). In the *Public Notice*, the Bureaus seek comment on detailed proposals for the challenge, verification, and crowdsourcing processes.

The proposals in the *Public Notice* are complex and highlight the challenges facing the Commission in carrying out the verification tasks it has been assigned by the Broadband DATA Act. In addition to modifying the *Public Notice*'s proposals as outlined below, to minimize the number of false positives and reduce the time and expense of responding to challenges, as

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[3] Broadband Deployment Accuracy and Technological Availability Act, Pub. L. No. 116-130, 134 Stat. 228 (2020) ("Broadband DATA Act"); *Establishing the Digital Opportunity Data Collection*; *Modernizing the FCC Form 477 Data Program*, Second Report and Order and Third Further Notice of Proposed Rulemaking, 35 FCC Rcd 7460, ¶¶ 33, 38-39 (2020) ("*Second Report and Order*").

[4] *Second Report and Order*, ¶ 48.

[5] *Establishing the Digital Opportunity Data Collection*; *Modernizing the FCC Form 477 Data Program*, Third Report and Order, 36 FCC Rcd 1126 (2021) ("*Third Report and Order*").

required by the Broadband DATA Act,[6] the Commission should implement the new processes in phases. Because the challenge and verification processes are so complex, the Commission should test them on a smaller scale, such as on the outdoor 4G maps, and then extend the processes to the other maps only after resolving any issues that arise during the initial implementation.

II. The Commission Should Implement the Challenge and Verification Processes in Phases

Under the rules adopted in the *Second Report and Order* and *Third Report and Order*, every mobile broadband provider must submit *eight* different coverage maps that could be the target of a challenge or a verification request: "pedestrian stationary" and "in-vehicle mobile" maps for each of 3G, 4G, 7/1 Mbps 5G, and 35/3 Mbps 5G technologies. One step that the Commission should take to reduce the complexity and burden of the challenge and verification processes is to grant CTIA's petition for reconsideration of the in-vehicle mapping requirement, which is not required by the Broadband DATA Act and introduces difficulties not present with outdoor, stationary maps.[7] As CTIA explained, requiring two maps per technology will cause consumer confusion about which maps pertain to them and will unnecessarily complicate the mapping, verification, and challenge processes.[8]

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[6] 47 U.S.C. §§ 642(b)(5)(B)(i)(III) (in establishing the challenge process, the Commission must consider "the need to mitigate the time and expense incurred by, and the administrative burdens placed on, entities or individuals in … responding to challenges").

[7] CTIA, Comments and Petition for Reconsideration, *Establishing the Digital Opportunity Data Collection et al*, WC Docket Nos. 19-195 & 11-10 (Sept. 8, 2020).

[8] *Id.* at 7.

If the Commission retains the in-vehicle mapping requirement, it should at a minimum defer the start of the challenge and verification processes for the in-vehicle maps. By first testing the new processes on a pedestrian map, the Commission will be able to refine its processes and resolve any issues that arise before tackling the even more complex task of implementing challenge and verification processes for the in-vehicle maps. The challenge and verification processes for in-vehicle maps must take into account several additional factors, such as the penetration loss from the test vehicle (which can vary widely from vehicle to vehicle), the speed of the vehicle, and the position of the test device in the vehicle.

The Commission should first implement the new challenge and verification processes for the pedestrian 4G maps, or at most for the pedestrian 4G and 5G maps. As the Mobility Fund Phase II ("MF-II") experience shows, there is no guarantee that the new processes will work smoothly from the beginning. For example, the Commission may find that many consumer challengers mistakenly conduct speed tests indoors, resulting in an unexpectedly high rate of false positives. By first testing the new processes on the 4G map, the Commission will be able to identify any issues and modify the procedures or provide additional guidance to challengers before extending the challenge and verification processes to the other maps.

Deferring the start of the challenge process for the 3G maps and the in-vehicle 4G and 5G maps is consistent with the Broadband DATA Act. Not only is the pedestrian 4G LTE coverage map the only map actually required by the Broadband DATA Act,[9] but the Act requires the Commission to consider "the costs to consumers and providers resulting from a misallocation of funds because of a reliance on outdated or otherwise inaccurate information in the coverage

[9] 47 U.S.C. § 642(b)(2)(B).

maps."[10] Because the 3G maps and in-vehicle maps will not be used to identify areas eligible for support from the 5G Fund[11] – the only source of funding potentially affected by the mobile broadband maps – deferring the challenge process for those maps will not result in any "misallocation of funds."

Focus on rural areas. In addition to testing the challenge and verification processes on the 4G maps, the Commission should at least initially permit challenges and verification requests only for rural areas.[12] Because urban areas are covered by multiple networks offering 4G or faster mobile broadband service, deferring the start of the new processes in urban areas would have little or no impact on the allocation of universal service support.[13] Restricting the initial challenges to rural areas would reduce the burdens on challengers, providers, and the Commission and focus the challenges on the coverage that matters for universal service purposes.

Review. The Commission should schedule a review of the challenge process to occur after an initial test period, e.g., nine months after the challenge process portal opens. In the *Third Report and Order*, the Commission found that "experience over time may warrant adjustments" to the challenge process, and directed Commission staff "to adjust the methodology for determining the threshold for a challenge and for establishing the boundaries of a challenge area"

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[10] 47 U.S.C. §§ 642(b)(5)(B)(i)(IV).

[11] *See Establishing a 5G Fund for Rural America*, Report and Order, 35 FCC Rcd 12,174, ¶ 17 (2020) ("*5G Fund Order*").

[12] For example, the Commission could use the Census Bureau definition of "rural." *See 5G Fund Order*, ¶ 85.

[13] *See Establishing a 5G Fund for Rural America*, Notice of Proposed Rulemaking and Order, 35 FCC Rcd 3994, ¶ 26 (2020) ("*5G Fund NPRM*") ("We believe both [Urbanized Areas and Urban Clusters] are likely to receive robust 5G service absent a subsidy.").

after notice and comment "[t]o the extent that experience warrants."[14] The Commission similarly gave the Bureaus the authority to modify the verification and crowdsourcing processes.[15]

Finally, the Commission should make clear that it may temporarily pause new challenge submissions until it has adjudicated the initial challenges, especially if the volume of challenges during the first months of the challenge process is greater than expected. Challengers and providers should not continue to incur the cost of speed testing, and add to the backlog of challenges requiring adjudication, if the Commission has not yet had an opportunity to adjudicate the initial challenges and begin evaluating whether any changes to the challenge process are required.

III. The Commission Should Design the Challenge Process to Minimize False Positives

In designing the challenge process, the Commission should aim to minimize the number of false positives, i.e., instances in which a challenger successfully establishes a challenge when there is, in fact, adequate coverage in an area.[16] Even if providers ultimately rebut false positive challenges, (1) providers and the Commission would still have to devote resources to rebutting and adjudicating the challenges; and (2) until the challenges are adjudicated, the false positives could temporarily create an incorrect impression that the new Broadband DATA Act maps are unreliable. And, because of the significant cost of conducting the speed tests required for a

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[14] *Third Report and Order*, ¶ 106. *See also Public Notice*, ¶ 12 ("Once the challenge process has been implemented, we anticipate that we may revisit and modify these thresholds, after notice and comment, if they are not sufficient to provide a clear determination of actual coverage conditions.").

[15] *Second Report and Order* ¶ 67; *Third Report and Order* ¶ 48.

[16] *Public Notice*, Technical Appendix at 40.

rebuttal under the Commission's proposal, a provider may elect to concede false positive challenges even though the resulting map would then be inaccurate, which could result in a "misallocation of funds," contrary to the Broadband DATA Act.[17]

In the *Public Notice*'s statistical analysis, Commission staff proposes to accept a 5 percent probability of finding inadequate coverage when there is actually adequate coverage,[18] which is a reasonable starting point. But there are several potential sources of error and bias that can be introduced into the challenge process, either deliberately or inadvertently, that the proposed procedures do not address or address only in part. For example, a challenger could conduct speed tests inside a building or a vehicle, with an old device that lacks power or does not support all relevant spectrum bands, or after exceeding a service plan's data limit. Similarly, a challenger could conduct repeated tests at the same location with marginal coverage or conduct tests only when network loading is likely to be greatest. The Commission should modify the proposed procedures to address these potential sources of error and bias.

A. Challengers Should Conduct Speed Tests Outside a Vehicle or a Building

The Commission should not adopt its proposal to use in-vehicle speed tests to evaluate pedestrian coverage maps.[19] Because the additional losses from the vehicle reduce the measured speed, in-vehicle speed tests do not provide a valid measurement of the coverage that would be

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[17] 47 U.S.C. §§ 642(b)(5)(B)(i)(IV).

[18] *Public Notice*, Technical Appendix at 40-41.

[19] To determine whether there is a cognizable challenge, the *Public Notice* proposes to first exclude any in-vehicle speed tests that are outside the target provider's in-vehicle coverage map and any outdoor speed tests that are outside the outdoor pedestrian coverage map. The *Public Notice* proposes to then aggregate all of the remaining in-vehicle and outdoor speed tests into a single dataset and use the combined dataset to evaluate both the in-vehicle and pedestrian coverage maps. *See Public Notice* ¶ 13.

experienced by an outdoor pedestrian. According to a study conducted for Ofcom, a vehicle adds a median vehicle penetration loss of about 8.9 dB, and often significantly more, depending on the type of vehicle and the location and orientation of the phone within the vehicle.[20] The study found that the standard deviation of the variation in the penetration loss was 5.6 dB, demonstrating that the penetration loss varies widely from vehicle to vehicle.[21] In addition, testing at highway speeds adds significant Doppler shift and spread to the both the downlink and uplink signals, resulting in a reduction in throughput compared to the same signal conditions but for a stationary user. As the Commission has explained, "low speed or stationary throughput measurements are typically higher than high mobility throughput measurements."[22]

If in-vehicle speed tests are used to evaluate outdoor pedestrian coverage, the added loss from the moving vehicle will result in widespread false positives, due to the pass/fail nature of the speed thresholds and the pass/fail nature of the proposed standards for a cognizable challenge. There will be many instances in which the added loss from the moving vehicle will cause a "negative" (below-threshold) measurement at a place and time where a stationary outdoor speed test would have recorded a "positive" (above-threshold) measurement. Speed test results that are inappropriately flipped from "positive" to "negative" will in turn cause hex-8 cells with good outdoor coverage to (incorrectly) meet the thresholds for a cognizable challenge.

To avoid that result, the Commission should use only stationary outdoor speed tests to evaluate the pedestrian coverage maps. While the Commission declined in the *Third Report and*

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[20] *See* "Final Report - In-car Mobile Signal Attenuation Measurements," LS Telecom for Ofcom, at 4 (reporting a median attenuation value of 8.9 dB) https://www.ofcom.org.uk/__data/assets/pdf_file/0019/108127/in-car-mobile-signal-attenuation-report.pdf ("*Ofcom Report*").

[21] *Id.*

[22] *5G Fund NPRM*, ¶ 118.

Order to require consumer challengers to conduct speed tests with the device outside a vehicle,[23] that does not prevent the Commission from excluding in-vehicle speed tests from the challenge calculations for pedestrian coverage maps. At a minimum, the Commission should require governmental and other *non-consumer* challengers to conduct speed tests with the device outside a vehicle, or at least with an external antenna, if they wish to challenge a pedestrian map. Not only are non-consumer challengers likely to submit a higher volume of challenges than consumer challengers,[24] but they have the technical capability to comply with more rigorous testing requirements.[25]

To the extent that the Commission permits challengers to submit in-vehicle speed tests, it should at least adopt certain constraints on the characteristics of the vehicle that non-consumer challengers use to conduct speed tests. For example, the Commission should prohibit challengers from conducting speed tests inside a vehicle with unusually high penetration loss, such as a cargo van or a vehicle with environmental glass treatment.[26]

Finally, the Commission should clearly explain, in the FCC Speed Test app and in all outreach material related to the challenge process, that consumers must conduct speed tests outdoors, *not* inside a building and, whenever possible, not inside a vehicle. Moreover, the

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[23] *Third Report and Order* ¶ 102 n.315.

[24] *Id*. ¶ 105 ("We recognize that, unlike the government and third party challenges, consumers likely will submit challenges regarding distinct, localized areas (e.g., at or near their homes and businesses) and will not have the time and resources to engage in testing a broader area or for extended periods.").

[25] *Id.* ¶ 117 (Non-consumer challengers must substantiate their data through the certification of a "qualified engineer or official," and must submit a complete description of the methodologies used to collect their data.).

[26] *See Ofcom Report*, at 24 ("The vehicle with the highest overall attenuation across positions and frequency bands was the vehicle F which is the van with fewer windows compared to the cars.").

Commission should clarify for all challengers the definition of the term "outdoor," which the challenge process rules use in two different ways. Whereas the testing rule distinguishes between "in-vehicle mobile" and "outdoor pedestrian" speed tests,[27] the certification rule requires the challenger to certify that "speed test measurements were taken outdoors,"[28] apparently using "outdoors" to refer to *both* the "in-vehicle mobile" and "outdoor pedestrian" test environments. Because the inconsistent uses of the term "outdoor" will create confusion, the Commission should make clear that an "outdoor pedestrian" speed test is one that is conducted by a stationary user with the device outside a building or vehicle.

B. The Commission Should Specify Additional Testing Requirements

The Commission should adopt several other provisions to reduce the risk of errors in challengers' speed measurements, thus improving the ultimate accuracy of the maps.

Test devices. To ensure that challengers' speed tests accurately assess the capability of the provider's network, the Commission should require challengers to conduct speed tests with a newer device that supports all relevant spectrum bands. To implement the *Third Report and Order*'s requirement that non-consumer challengers use a device "advertised by the challenged provider as compatible with its network,"[29] the Commission should (1) require providers to publish on their website a list of devices "advertised … as compatible with the provider's network" for challenge process purposes; and (2) exclude consumer and non-consumer

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[27] 47 C.F.R. §§ 1.7006(e)(1)(iii), 1.7006(f)(1)(i)(G).

[28] 47 C.F.R. §§ 1.7006(e)(1)(iv), 1.7006(f)(2).

[29] *Third Report and Order* ¶ 118; 47 C.F.R. § 1.7006(f)(2).

challengers' speed tests from the challenge calculations if the provider can show that the speed tests were not conducted with a listed "compatible" device.

Service plans. The *Public Notice*'s assumption that "situations in which a mobile service provider has throttled speeds of consumers that exceed data limits will have little, if any, effect on the challenge process"[30] is incorrect, given that both consumer and non-consumer challengers may initiate a large number of tests and may continue doing so even after exceeding data limits. As in the MF-II challenge process, the Commission should (1) require non-consumer challengers to use "[a]n appropriate service plan [that would] allow for speed tests of full network performance";[31] and (2) exclude consumer and non-consumer speed tests from the challenge calculations if the provider can show that the particular device that a challenger used to conduct speed tests was subject to reduced speeds.[32]

Testing the correct network. The Commission should adopt its proposal to compare each speed test against the relevant coverage map, i.e., to propose to compare speed tests for a particular network technology (e.g., 3G, 4G LTE, or 5G) to the coverage maps for the corresponding technology.[33] Specifically, only speed tests conducted on 3G networks should be used to challenge 3G coverage, only speed tests conducted on 4G LTE networks should be used to challenge 4G LTE coverage, and only speed tests conducted on 5G-NR networks should be used to challenge 5G-NR coverage.[34]

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[30] *Public Notice* ¶ 11.

[31] *Procedures for the Mobility Fund Phase II Challenge Process*, Public Notice, 33 FCC Rcd 1985, ¶ 18 (2018) ("*MF-II Challenge Procedures PN*").

[32] *Id.* ¶ 51.

[33] *Public Notice* ¶ 9.

[34] *Id.*, Technical Appendix at 36.

C. The Commission Should Modify the Proposed Challenge Thresholds

While the proposal to evaluate challenges over hexagonal areas raises several implementation issues,[35] other aspects of the proposed framework represent a significant improvement over the MF-II approach. In particular, the Commission should adopt its proposal to evaluate challenges based on the *percentage* of tests in a cell that are below the relevant speed threshold,[36] and should also adopt its proposal to require that speed tests meet "geographic" and "temporal" thresholds.[37] However, the Commission should modify the specific thresholds and make other targeted changes to the proposed framework.

Geographic threshold. The proposed "geographic threshold" requires at least two speed tests, one of which is negative, in four of the seven "point-hexes" within a hex-8 cell.[38] This proposal would allow cognizable challenges even if substantially all of the negative tests are in a single point-hex (and, in fact, even if substantially all of the negative tests are at one location within that single point-hex). There could be just one negative test in three of the other point-hexes and no negative tests in the remaining three point-hexes. This minimal level of geographic diversity falls well short of the Commission's goal of requiring challengers to "demonstrate that [a] lack of coverage exists over a sufficiently large area and is not concentrated in one small

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[35] Because carriers' existing tools are designed to work with grid-based systems such as the Military Grade Reference System (MGRS), carriers will have to develop new tools and systems for managing speed tests and evaluating data in an H3-based environment. In addition, the fact that child cells do not nest exactly into their parent cell complicates the tracking and evaluation of speed test data. *See Public Notice*, Technical Appendix at n.22.

[36] Under the MF-II approach, above-threshold tests were ignored and a handful of below-threshold tests was sufficient to generate a presumptively successful challenge. *Connect America Fund; Universal Service Reform – Mobility Fund*, Order on Reconsideration, 33 FCC Rcd 4440, ¶ 4 (2018).

[37] *Public Notice* ¶ 12.

[38] *Id*.

area."[39] To better ensure that any lack of coverage is not concentrated in one small area, the Commission should modify the geographic threshold to require that no more than half of the negative tests are in any single point-hex.

Temporal threshold. For the temporal threshold, the *Public Notice* proposes to require at least two negative tests at different times of day, separated by at least four hours.[40] This proposal would establish a cognizable challenge even if substantially all of the negative tests are at the same time of day, as long as just one of the negative tests is separated from the other negative tests by at least four hours. This minimal level of temporal diversity falls short of the Commission's goal of requiring challengers to "demonstrate the lack of coverage is persistent rather than temporary."[41] It would, for example, permit a cognizable challenge if virtually all tests are conducted at a time when network loading temporarily exceeds the prescribed 50 percent loading factor. To better reflect the variability of cell loading and ensure that any lack of coverage is persistent, the Commission should categorize tests into four-hour ranges (e.g., 6 to 10 a.m., 10 a.m. to 2 p.m.) and require that more than one temporal range have a meaningful percentage of the negative tests.[42]

Challenges to hex-6 and hex-7 cells. The *Public Notice* proposes to establish a cognizable challenge for a 5 square kilometer hex-7 cell or a 36 square kilometer hex-6 cell if at least four of the larger hexagon's seven child hexagons are considered challenged.[43] The Commission should not adopt this proposal because it would permit challenges to large areas without any on-the-

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[39] *Id.*, Technical Appendix at 37.

[40] *Id.* ¶ 12.

[41] *Id.*, Technical Appendix at 39.

[42] *Id.* ¶ 12.

[43] *Id*.

ground speed test evidence. In fact, the Commission's proposal could permit a cognizable challenge for an entire 36 square kilometer hex-6 cell even if less than one-third of the hex-8 cells (16 out of 49) within the hex-6 cell have actually been tested.

IV. The Commission Should Give Providers Flexibility in Responding to Challenges

The *Public Notice* does not propose any deadlines for challengers, and proposes to base challenges on all tests submitted over the previous year.[44] Yet the rules give providers just 60 days to respond to a challenge.[45] To rebut a challenge, the provider must, in that 60-day interval, conduct its own speed tests or provide infrastructure data for the challenged hex-8 cells.[46] Given that it is unknown how many challenges will be submitted, the Commission should modify the proposed rebuttal procedures in several respects to give providers additional flexibility and reduce the time and expense of responding to challenges.

Non-representative challenger speed tests. As the *Public Notice* acknowledges, there are several scenarios in which a challenger's speed tests may be invalid or non-representative of network performance,[47] such as speed tests conducted with a device that does not support all relevant spectrum bands. However, the *Public Notice*'s proposal to require challenged providers to submit the entire list of infrastructure data to rebut challenges based on speed tests that are invalid or non-representative of network performance is unnecessarily burdensome.[48] Because detailed information about the network is not necessary to show that (1) tests at a given time

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[44] *Id.*, Technical Appendix at 33.

[45] *Third Report and Order* ¶¶ 108, 121.

[46] *Id.*

[47] *Public Notice* ¶ 20.

[48] *Id*.

were affected by a network outage; (2) the challenger's device did not support all relevant spectrum bands; (3) the challenger's account was subject to reduced speeds for exceeding a usage limit; or (4) the challenger conducted speed tests indoors, the Commission should give providers the flexibility to provide other forms of evidence demonstrating that specific speed tests were invalid. The Commission should also permit providers to demonstrate that, based on a non-consumer challenger's description of its testing methodology,[49] the challenger's methodology could not have produced sufficiently reliable speed test data.

Speed testing software and hardware. The *Public Notice* proposes to permit providers to collect speed test data using the FCC Speed test app, another speed test app approved by OET, or "other software and hardware if approved by staff,"[50] but it does not specify how Commission staff would evaluate and approve the "software and hardware" that a provider proposes to use. The Commission should establish a presumption that staff will approve any speed measurement software and hardware that a provider uses in the ordinary course of business.

Respondent speed testing methodology. The Commission proposes to require providers to submit speed test data "consistent with the specific testing parameters and methodologies" for challengers' speed test data."[51] Although that proposal is generally reasonable, the Commission should recognize key differences between challengers and providers responding to challenges. For example, the Commission should give providers more flexibility to choose how they conduct speed tests. While it is essential that *challengers* conduct speed tests outdoors, the Commission should permit providers to choose whether to conduct speed tests outdoors, from inside a vehicle,

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[49] *Third Report and Order* ¶ 117 ("Government and third-party challengers must also submit a complete description of the methodologies used to collect their data.").

[50] *Public Notice* ¶ 17.

[51] *Id*.

or with an external antenna. Even though the provider may measure lower speeds from inside a vehicle than outdoors, reducing its ability to rebut the challenge, in-vehicle testing may allow the provider to test a larger area in the 60-day response window. And challengers are not prejudiced if a provider can demonstrate adequate coverage with in-vehicle tests. Similarly, while crowdsourced data is not sufficiently reliable to be used as the basis for a challenge, the Commission should permit providers to use crowdsourced speed test data in a rebuttal.

Responses based on infrastructure data. The Commission should not adopt the *Public Notice*'s proposal to permit providers to use infrastructure data to rebut a challenge only in four limited circumstances.[52] The *Third Report and Order* permits providers to rebut *any* challenge with infrastructure data[53] and does not give the Bureaus the authority to limit the circumstances in which a provider may rebut a challenge with infrastructure data.[54]

Required infrastructure data. The Commission should modify the proposed list of infrastructure data items.[55] The proposed list, which is twice as long as the list adopted by the Commission in the *Third Report and Order*, includes several items that are unnecessary or unclear, or that providers could not readily provide, including (1) throughput and associated required signal strength and signal to noise ratio;[56] (2) cell loading distribution;[57] and (3) areas

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[52] *Id.* ¶ 20.

[53] *Third Report and Order* ¶ 121 ("We require providers … to submit a rebuttal to the challenge within a 60-day period of receiving notice of the challenge, which rebuttal *shall consist of* either data from on-the-ground tests *or infrastructure data*….")(emphases added).

[54] The *Public Notice* relies on paragraph 48 of the *Third Report and Order*. *Public Notice* ¶¶ 20, 46-50. However, that paragraph (1) does not apply to the challenge process; and (2) only gives the Bureaus the authority to "provide guidance" about what types of data will be "more probative," not to preclude most rebuttals based on infrastructure data.

[55] *Public Notice* ¶ 39.

[56] This requirement is unclear. If it is referring to the relationship between throughput and the signal-to-noise ratio for a particular transmitter, such "modem curves" are proprietary. The

enabled with carrier aggregation and a list of band combinations (including the percentage of handset population capable of using this band combination).[58]

Transmitter monitoring software. Under the challenge process rules, a provider may voluntarily submit output from transmitter monitoring software to support a rebuttal, but such data may not be used in lieu of on-the-ground testing or infrastructure data.[59] The *Public Notice* seeks comment regarding the conditions under which a provider's transmitter monitoring software can be relied upon by staff in resolving challenges.[60] The Commission should give significant weight to the output from transmitter monitoring software because it provides a comprehensive picture of network performance. Whereas the proposed speed testing framework looks only at a small sample of sessions, transmitter monitoring software provides data for all sessions, from all devices and at all times of the day, thus largely avoiding different forms of error and bias that could affect a speed test sample.

Extension of time. The *Public Notice* acknowledges that a provider may not be able to respond to a challenge within 60 days due, for example, to the inability to collect on-the-ground data during certain months of the year or other unforeseen circumstances.[61] In those cases, the

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Commission could use standard models defined by 3GPP such as that given in 3GPP 36.942 Annex A.1 with the additional supporting information contained in 38.306 §4.1.2.

[57] It is unclear if this item refers to a time distribution, geographic distribution or probabilistic distribution, and it is unclear if it refers to each transmitter included in the infrastructure data submission or to all transmitters.

[58] Commission staff do not require "the percentage of handset population capable of using this band combination" to assess coverage. In addition, this proposed requirement is unduly burdensome because the percentage of handsets supporting a particular band combination is always changing and would have to be recalculated for each verification request.

[59] *Third Report and Order* ¶ 110.

[60] *Public Notice* ¶ 25.

[61] *Id.* ¶ 21.

Commission should permit the provider to choose to seek either (1) a waiver of any limitation in the rules on the permitted uses of infrastructure data or transmitter monitoring software; or (2) for a provider electing to rebut the challenge with speed test data, a waiver of the 60-day deadline.

Re-challenges after a rebuttal. If a provider successfully rebuts a challenge, the challenged area should be ineligible for subsequent challenge for at least three years. The Commission should not adopt its proposal to permit a re-challenge as soon as the first map filing six months after a challenge is resolved.[62] Contrary to the suggestion in the *Public Notice* that "coverage may change over time due to changes in technology and infrastructure,"[63] it is highly unlikely that coverage will be *reduced* due to such changes, and even less likely that coverage will be reduced in less than a year. The burden imposed on a provider that must repeatedly rebut challenges to the same area far outweighs the minimal chance that coverage will deteriorate after a provider rebuts a challenge.

V. The Commission Should Modify the Proposed Verification Requirements

In the *Third Report and Order*, the Commission decided that staff could request and collect verification data from a provider on a case-by-case basis "only where staff have a credible basis for verifying the provider's coverage data."[64] The *Public Notice*'s proposed criteria for identifying a "credible basis" for issuing verification requests are vague and would impose unnecessary burdens on service providers.

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[62] *Id.* ¶ 18.

[63] *Id.*

[64] *Third Report and Order* ¶ 47.

Credible basis. The *Public Notice* proposes to identify areas requiring verification "based upon all available evidence, including submitted speed test data, infrastructure data, crowdsourced and other third-party data, as well as staff evaluation and knowledge of submitted coverage data (including maps, link budget parameters, and other credible information)."[65] But none of those items can reliably provide a "credible basis" for verifying a coverage map. If "submitted speed test data" does not meet the threshold for a cognizable challenge, then it should not be used as the basis for a verification request. "Crowdsourced and third party data" is of very limited value because it is not statistically significant and is not collected under controlled conditions. And the *Public Notice* does not explain the conditions under which the results of "staff evaluation and knowledge of submitted coverage data (including maps, link budget parameters, and other credible information)" would trigger a request for verification data, suggesting that staff has near unfettered discretion to determine a "credible basis" for seeking verification.

In light of the uncertain value of each of the listed forms of evidence, the Commission should set a meaningful bar and make clear that a "credible basis" for a verification request exists only when several types of evidence indicate that there is a substantial likelihood that a map requires adjustment. And, as contemplated by the *Second Report and Order*, the Commission should establish a process that would allow providers to review and respond to staff's basis for a verification request before staff formally issues the verification request and

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[65] *Public Notice* ¶ 27.

starts the 60-day clock.[66] The Commission should require staff to give the provider at least 15 days to comment on staff's analysis and the information that staff used to conduct its analysis.

Verification areas. The *Public Notice* proposes to require providers to submit speed test or infrastructure data for a sample of hex-8 cells in the "targeted area."[67] Under the proposal, staff would group all of the hex-8 cells with roads into strata, select a random sample of hex-8 cells from each stratum, and require the provider to submit speed test data or infrastructure data for the selected cells. In its August 12th webinar on the proposed challenge and verification processes, Commission staff provided an example of a targeted area covering seven counties and 4,100 square kilometers, for which the provider would have to submit speed test data or infrastructure data for a sample of 164 hex-8 cells.[68] Given that providers must respond to verification requests within 60 days, such an expansive verification request would impose undue burdens on the service provider.

At least initially, until providers and the Commission have gained experience with the verification process and the Commission has confirmed that staff can reliably identify areas where a provider's map is likely to require adjustment, the Commission should test the verification process on a smaller scale. Specifically, the Commission should limit the number of verifications to no more than one per map submission, i.e., no more than two verifications per provider each year, and should limit the area subject to verification to no more than three

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[66] *See Second Report and Order* ¶ 75 ("once staff have evaluated a particular crowdsourced data submission and established the need to take a closer look at a provider's data, staff will contact the provider and offer it an opportunity to explain any discrepancies between its data and the Commission's analysis").

[67] *Public Notice* ¶¶ 28-29.

[68] *See* fcc.gov/news-events/events/2021/08/broadband-data-task-force-webinar-proposals-bdc-mobile-challenge.

contiguous hex-6 cells (approximately 110 square kilometers). Such limits are necessary to ensure that providers can respond to the verification request within 60 days.

Staff propagation maps. The *Public Notice* proposes that, if a provider submits infrastructure data in response to a verification request, Commission staff would generate its own predicted coverage maps using the data submitted by the provider.[69] The Commission should limit such predictive studies to localized examinations of the reasonableness of a service provider's map, rather than attempt to replicate the scale and scope of the industry's modeling capability. Verizon has previously suggested that the Commission could use a statistically based propagation model, e.g., ITU-R P.1546-6 "Method for Point-to-Area Predictions 30-4000 MHz," and limited information from the submitting provider to make a reasonable coverage estimate and compare it against the submitted link budget information.[70] Rather than require each provider to submit the long list of infrastructure items proposed in paragraph 39 of the *Public Notice*, the Commission would only need to obtain (1) the geographic coordinates of each transmitter; (2) the elevation above ground level for each base station and other antenna specifications; and (3) the operate transmit power of the radio equipment at each cell site.[71] The Commission should also obtain the number of transmit and receive antennas equipped for each transceiver per band. Together with the submitted link budget information, this infrastructure information is sufficient for staff to assess the reasonableness of the provider's map.

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[69] *Public Notice* ¶ 37.

[70] Verizon Comments, *Establishing the Digital Opportunity Data Collection et al*, WC Docket Nos. 19-195 & 11-10, at 14-15, 27 (Sept. 8, 2020).

[71] Rather than request the "throughput and associated required signal strength and signal to noise ratio," the Commission should use a standardized SNR-Throughput function, such as that given in 3GPP 36.942 Annex A.1 with the additional supporting information contained in 38.306 §4.1.2. The "cell loading distribution" is not necessary as the assumed loading reflected in the provider's map is already known.

Requests for additional information. Under the rules adopted in the *Third Report and Order*, staff may request additional information after a provider responds to a verification request.[72] The Commission should make clear that if a provider responds to a verification request with speed test data that meets the statistical tests, then staff may not also request infrastructure data, contrary to the suggestion in the *Public Notice*.[73] At a minimum, the Commission should make clear that a successful response based on speed test data will trump the results of any propagation modeling undertaken by staff.

VI. The Commission Should Give Little Weight to Crowdsourced Data

The Broadband DATA Act requires the Commission to "develop a process through which entities or individuals . . . may submit specific information about the deployment and availability of broadband internet access service . . . on an ongoing basis . . . to verify and supplement information provided by providers,"[74] i.e., crowdsourced data. In the *Second Report and Order*, the Commission directed the Bureaus "to develop and refine a process for entities and individuals to submit third-party fixed and mobile crowdsourced data consistent with the Broadband DATA Act's requirements and the Commission's policies."[75]

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[72] *Third Report and Order* ¶ 50.

[73] *Public Notice* ¶ 35 (On the one hand, the *Public Notice* proposes that "if the service provider is able to show sufficient coverage in the selected resolution 8 hexagon, the provider would have successfully demonstrated coverage to satisfy the verification request in that hexagon." But the *Public Notice* also proposes that "[s]taff may consider other relevant data submitted by providers, may request additional information from the provider (including infrastructure data, if necessary), and may take other actions as may be necessary to ensure the reliability and accuracy of the verification process.").

[74] 47 U.S.C. § 644(b)(1).

[75] *Second Report and Order* ¶ 66.

The *Public Notice*'s proposal to accept "as crowdsourced information speed tests taken with an authorized app that do not meet the criteria needed to create a cognizable challenge or are otherwise not intended to be used to challenge the accuracy of a mobile service providers' map" is reasonable.[76] Similarly, the Commission should adopt its proposal to permit consumers and other entities to submit crowdsourced data collected using either the Commission's Speed Test app or other speed test apps approved by OET.[77]

The Commission should not adopt the proposal to "evaluate mobile crowdsourced data through an automated process" and use "data clustering to identify potential targeted areas where crowdsourced tests indicate a provider's coverage map is inaccurate."[78] Regardless of which app is used to collect the data, crowdsourced data cannot be used to "indicate a provider's coverage map is inaccurate." As the Commission has found, "bias is often introduced into [crowdsourced] speed test data because tests are performed only at specific times and places, potentially providing a less accurate snapshot of mobile broadband performance."[79] In addition, because there is no control over the testing conditions, the crowdsourced dataset may include tests conducted indoors, with old or defective devices, or subject to reduced speeds due to plan limits.[80] For these reasons, the Commission directed to bureaus to prioritize the consideration of crowdsourced data from applications that are "highly reliable" and to consider whether a speed

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[76] *Public Notice* ¶ 52.

[77] *Id.* ¶¶ 52-54.

[78] *Id.* ¶¶ 56-57.

[79] *Second Report and Order* ¶ 65 (also noting that "methods by which different speed test apps collect data may vary and may not use techniques that control for certain variables").

[80] *See generally Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993*; *Annual Report and Analysis of Competitive Market Conditions with Respect to Mobile Wireless, Including Commercial Mobile Services*, Twentieth Report, 32 FCC Rcd 8968, ¶ 88 (2017) (discussing limits of crowdsourced speed test data).

test application produces "statistically significant results" and is designed so as not to introduce bias into test results."[81] If the Commission decides to move forward with its proposal to conduct automated analysis of crowdsourced data, it should issue a more detailed proposal and seek further comment on its proposed algorithm, data sources, and criteria for identifying potential targeted areas.

VII. Conclusion

For the reasons stated herein, the Commission should make targeted changes to the challenge, verification, and crowdsourcing processes proposed in the *Public Notice*.

Respectfully submitted,

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[81] *Second Report and Order* ¶ 66.